

T11D – Determination of Specific Heat of a metal by Calorimetry

Your task is to calculate the specific heat of a given metal object using a basic coffee cup calorimeter and graphically adjusting for heat loss. You will be graded on DCP and CE for this assignment.

Materials:

- Unknown Metal
- Thermometer (ethanol)
- Hot Plate or Bunsen Burner w/ triangle
- Electronic Balance
- DI water
- Coffee Cup
- Boiling Chip
- Forceps or test tube clamp
- 250 cm³ beaker

Methods:

1. Set up a hot water bath (at or near boiling) in a 250 cm³ beaker by adding roughly 150 cm³ water to the beaker and placing over a Bunsen burner or hot plate. *Be sure to include a boiling chip to avoid superheating the water.*
2. Add your unknown metal to the hot water bath and let remain for at least 5 minutes to be sure the metal has reached the temperature of the water bath.
3. Set up a coffee cup calorimeter with a known volume of water.
4. Remove the metal with forceps or test tube clamp and place directly into the calorimeter
5. Record measurements until 5-10 minutes AFTER the water and metal have reached thermal equilibrium
6. Repeat as needed, using the data collected to determine the specific heat of the meal object.

Conclusion Evaluation (CE):

Report your findings and discuss the percent uncertainty and percent error and their relationship to random and systematic errors involved in your experiment. Evaluate the lab and procedures, specifically suggesting what can be done to improve the lab and decrease random error.